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ABSTRACT

This paper presents two studies of the development of social competencies in infancy. In the first experiment, the central issue investigated was whether facial configuration or height is utilized by infants to respond differentially to children and adults. Five different strangers, a male and a female child, a male and a female adult, and a small adult female of the children's height (midget), each approached 40 different infants between the ages of 7 and 24 months. The infants did respond as if there were three classes of persons; infants as young as 7 months of age reacted to the size-facial configuration discrepancy of the small adult. The second experiment examined infants' relationship with other infants and further explored person differentiation. Sixteen groups of four infants, either 12-13 months or 18-19 months of age, were observed while in a playroom with their mothers. The data indicate that infants respond differently to unfamiliar adults, peers, and their own mothers. Also, developmental trends in peer interaction were traced, as the 12- and 18-month-olds were found to differ in terms of their peer-peer interactions. (SDH)

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SOCIAL PERCEPTION AND PEER GROUP INTERACTION IN INFANCY

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How the infant perceives and interacts with other persons is an important area of inquiry as it deals with origins of social behavior. The purpose of this research was to study two aspects of the development of social competencies in infancy. First, we were interested in the infant's reactions to strangers as they relate to his categorization of his social world. Second, the infant's relationships with, as well as his perception of, other persons--specifically his peers--was of interest. Two studies were designed and conducted to explore the social dimensions of persons which are perceived and used by the infant and the dynamics of peer group interaction in the very young.

Social perception in infancy

As has been shown in numerous studies, and even is obvious to the casual observer, infants differentiate between familiar and unfamiliar persons--specifically between the infant's own mother and other adult females. However, infants at a very young age are capable of much more complex social discriminations. Infants respond differently to males and females (Benjamin, 1961; Morgan & Riccuiti, 1969; Shaffran & Décarie, 1973), to children and adults (Greenberg, Hillman, & Grice, 1973; Lewis & Brooks, 1972, 1974), and to mothers and fathers (Kotelchuck, 1974; Lewis, Weinraub, & Ban, 1973). The infant must utilize a variety of cues from the social world in order to respond in such a varied manner to different classes of persons. We hypothesized that three dimensions, two physical and one social, are perceived by the very young infant and in fact are used by him to categorize and to respond appropriately to other persons. These three dimensions--age, gender, and familiarity--were systematically varied in the present study in order to explore their importance in early social perception. The dimension of age was of special interest since we had found in an earlier study that infants responded positively to a child but negatively to an adult stranger. Either size or facial configuration might account for the child-adult differentiation. Therefore these two physical characteristics were isolated by the use of a small adult (midget) as well as a child and normal-sized adult stranger. We were interested in whether the infant would treat the small adult as a child or as an adult.

As stated in the original proposal, there were four specific aims of the study:

1) to replicate the original findings of child-adult differentiation with a larger sample of infants;

2) to examine the effects of three independent subject variables--age, sex, and birth order;

3) to explore the effect of gender on person differentiation;

4) to study the effect of stranger size and facial configuration on person differentiation.

These four aims are discussed in the following manner. The data are presented in the form of a research report which was written in June, 1974. This paper has been submitted for publication in a developmental psychology journal. It is a rough draft and not to be quoted without permission of the authors.

Infants' Social Responses to Social Events

Jeanne Brooks and Michael Lewis

Educational Testing Service

Abstract

Infants respond differentially, and at times with fear-like behavior, to unfamiliar persons. The central issue of the present study was whether facial configuration or height is utilized by the infant to respond differentially to children and adults. Five different strangers, a male and a female child, a male and a female adult, and a small adult female the same height as the children (midget), each approached 40 different infants. The infants responded as if there were three classes of persons--adults, children, and small adults. Infants as young as seven months of age reacted to the size-facial configuration discrepancy of the small adult condition.

Infants' Social Responses to Social Events

Jeanne Brooks and Michael Lewis [1]

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The infant's capacity to differentiate his social world has been a major area of inquiry. Emphasis has been placed on differentiation of familiar and unfamiliar persons. However, the more specific characteristics to which the infant responds have not been examined. The research reported here is part of a series designed to explore the discriminable features of persons.

Traditionally, two areas have been studied--1) attachment, or the bond between infant and caregiver, and 2) fear, or the infant's reaction to the unfamiliar or strange. Both provide information about the infant's perception of and relation to his social world, although the tendency is not to categorize it as such. In addition, attachment and fear have been studied as two dichotomous systems instead of as interdependent ones (Lewis & Rosenblum, 1974). It is our view that systems such as fear, exploration, affiliation, and attachment are activated simultaneously but to varying degrees and that the study of these systems and the resulting behaviors will clarify the process by which the infant categorizes and responds to his social world.

The postulation of a fear system which is "a uniquely organized set of responses integrated within the central nervous system" (Lewis & Rosenblum, 1974) but is also dependent upon other systems leads us to question the efficacy of the traditional fear paradigm. First, there is no single behavior which may act as a necessary and sufficient referent for fear. Even crying may be elicited in situations which are not fearful. Typically, several measures are taken, although these are usually limited

to those behaviors which are related to the postulated fear system--crying, screaming, frowning, fleeing, and freezing. Behaviors such as smiling, looking, laughing, and waving usually are excluded since they are considered to be within the domain of the affiliative or exploratory systems. The problems of the systems approach can be best seen in the approach of a stranger. Both fear and affiliative systems and the behaviors of those systems may be expressed at different times or even at the same time. In order not to prejudge the infant's response to a social event by limiting the types of behaviors observed to a postulated evoked system, we should carefully examine the patterns of behaviors elicited by different social events.

The infant's response to persons may be conceptualized in terms of person perception rather than attachment and fear. Social perception has been defined as "the process by which man comes to know and to think about other persons, their characteristics, qualities and inner states" (Tagiuri, 1969). While issues in the study of adult social perception center on how people perceive others' personality and emotions, we are trying to understand the origins of recognition and differentiation. In the present study we are concerned with the infant's ability to discriminate among classes of unfamiliar persons.

What do we know about the infant's responses to different persons? Most studies on fear of the strange were not concerned with differentiation, since it was assumed that strangers per se elicited fear (Bowlby, 1973). This led to the practice of treating strangers as equivalent. However, this is not the case. Infants respond differentially to persons as a function of physical characteristics, stimulus context, cognitive strategies, and prior experience. The fear literature typically has not dealt with the effects of any of these dimensions, although a number of investigators are currently studying the effects of situation or context. Sroufe, Waters, and Matas (1974) and Bretherton and Ainsworth (1974) have found that infants respond differently at home and in the laboratory; Sroufe, Waters and Matas (1974) have

demonstrated that infants are affected by the sequencing of events; and Shaffran and Décarie (1973) have shown that infants react differently to repeated presentations of the same stranger.

The effect of physical characteristics on differentiation provided the impetus for the present study. We found, in an earlier study (Lewis & Brooks, 1972), that infants who exhibit fear do so discriminately--the infants in that study exhibited "fear" behaviors to adult strangers but not in the presence of child strangers. Instead, they tended to smile or reach towards the approaching children. These findings were replicated by Greenberg, Hillman, and Grice (1973).

The finding that infants respond differentially to children and adults raised additional questions. What are the age-related characteristics which are salient for the infants? Two major physical characteristics of age are size and facial configuration. Either may account for the differentiation. Hess (1970) has suggested that the rounded features of the young may elicit certain behaviors in the adult. Perhaps facial configuration is also salient for the infant. Size may also affect a conspecific's behavior. For example, adults may be perceived as more threatening due to their size, which would result in wariness or fear. To see whether size or facial configuration accounts for the child-adult differentiation, these two variables were systematically varied by utilizing different-sized strangers. Specifically, children and adults were used as strangers, with the adults varying in height: one adult was the same height as the children (3'10"), another was a normal height (5'3"). Thus, height was controlled by the use of child-sized and normal-sized adults and age was controlled by the use of children and adult strangers. If size is the relevant differentiating factor, the infants would be expected to respond

similarly to the children and small adult but differently to the taller adults. If age is relevant, differential responding would occur for the adult and the child conditions.

Thus, the effects of two physical characteristics--height and facial configuration--on infants' responses to strangers were examined. In addition, the sex of the stranger was varied in order to investigate the saliency of gender as a third characteristic.

Method

Subjects

Forty Caucasian infants ranging from 7 to 24 months of age were seen. Approximately equal numbers of males (N=21) and females (N=19) were included in the sample. Half of the infants were less than and half were more than 12 months of age. The infants came from predominately middle and upper middle class backgrounds.

Subjects were recruited by placing an article in local papers. The article stated that we were interested in studying infants' reactions to strangers. Therefore, our infants may be more wary than a sample of infants selected without reference to the purpose of the study.

Procedure

Each infant was greeted by and interacted with one experimenter in order to minimize exposure to strange adults. The greeter did not initiate much behavior toward the infant and instead talked only to the mother. The mother was given the following set of instructions to read.

> We are interested in why infants are wary or fearful of strangers. Although many psychologists have studied at what age babies exhibit fear, no one has looked at babies' reactions to different strangers. Are babies equally fearful of male and female strangers? Do they respond differently to children and adults? We are specifically interested in the latter question.

Therefore, six different strangers will approach you and your child. Two are children, four are adults. Three of the adults are over 5 feet, the other is the same height as the children.

Your child will be placed in a baby tenda. There is a chair by the tenda for you. Once the baby is seated, there will be a knock on the door. Please say "come in." The stranger will slowly walk toward your child and will bend down and touch his/her hand. Then the stranger will turn and walk out of the room. Do not talk to your baby or the stranger during this procedure. If your baby turns to you or cries, please do not comfort him/her until the stranger has left the room. Once the stranger has left, you may comfort and talk to your baby. Please do not take him/her out of the tenda (since babies often will resist going back into the tenda). When the baby is calm again, the second stranger will knock and you will say "come in." The procedure will be repeated six times altogether.

Observers will watch your baby's reactions through two one-way mirrors which are in the room. There is also a camera in the room.

Your child will be given a small toy when he/she is situated in the tenda. Please do not bring any other toys or food into the room.

Are there any questions?

The mother was also told the experiment would be stopped if at any time her infant was upset. The mother and infant were then taken into a pleasantly furnished room which was approximately 3.3 x 4 meters. After the infant was placed in the tenda, the first stranger knocked. The mother, who was sitting next to the infant, said "come in". The stranger entered, slowly walked toward the infant, bent down, and touched his hand. Then the stranger turned, walked to the door and left. The strangers did not vocalize, since the child strangers were not able to repeat an exact vocalization sequence. The strangers smiled slightly and did not change their facial expression throughout the approach. The approach took approximately 12 seconds.

There was a one-minute interval between strangers. Only one infant could not be comforted in the one-minute interval, and she was subsequently eliminated from the experiment due to illness.

After the six approaches, the infant and mother were taken back to the waiting room where the objectives of the research were further explained and the mother completed a short queationnaire.

Stranger conditions

The six stranger conditions were 1) a 5-year-old female, 2) a 5-year-old male, 3) a small adult female (midget), 4) an adult female of normal height, 5) an adult male of normal height, and 6) the greeter, who was female. The children and the small adult were 3'10" in height; the other three adults were 5'3" to 5'6". With respect to age, the children were five years, the adult females were approximately 40 years, and the adult male and the greeter were 26 years of age. Thus, both height and age were controlled in the first four conditions. Two different female children and two different greeters were used as strangers.[2] The other four strangers were constant. The females wore skirts while the male strangers wore slacks.

The order of appearance of the stranger conditions was balanced such that an adult always followed a child stranger. This was done so that the adult could imitate any deviations in approach made by the child. For example, if one of the children approached too quickly, the adult would also do so. Such deviations occurred in approximately 10% of the child trials. The last strangers to approach were always the greeter and the adult male.

Measurement

The infants' reactions to the six stranger conditions were observed behind a one-way mirror and were videotaped by a camera in the test room. The camera, which was approximately 5 feet from the infant, was generally ignored by the infants.

A number of behavioral responses were observed subsequently and coded from the videotape. These included facial expressions, vocalizations, activity levels, directionality of body movements, amount of looking, and direction of looks. Each category included a number of behaviors, which are listed in Table 1.

Insert Table 1 about here

As can be seen, we coded much more than the "typical" fear behaviors. This was done for two reasons. First, our emphasis is not on fear per se, but on differentiation. Second, as was noted earlier, the activation of one system does not preclude the activation of other systems. By looking only at the fear system, researchers tend to prejudge the infant's response to a strange situation by excluding the affiliative and exploratory systems.

The absence or presence of each behavior listed in Table 1 was coded at five distances in relation to the infant. The distances are defined below.

Distance 1 (far) -- stranger entered room.

Distance 2 (middle) -- stranger was in the middle of the room, approximately 7 feet from the subject.

Distance 3 (close) -- stranger was 3 feet from the infant.

Distance 4 (touch) -- stranger touched the infant's hand.

Distance 5 (leave) -- stranger turned and left the room.

Observer reliability

Observer reliability was measured by the proportion of agreements (PA) between two observers for 8 of the 40 subjects. The presence or absence of each behavior for each distance was noted. Table 2 presents the proportion of agreements for seven behavior categories. As can be seen, reliabilities were quite high, ranging from .83 (Attention) to .98 (Vocalization).

Insert Table 2 about here

Results

In order to see whether differential responding occurred, the infants' responses to the five social events were examined by two different methods.

A wide number of behaviors which are typically used in social perception studies was examined separately and the clustering or patterning of various behaviors within each stranger condition was also studied. Typically, separate behaviors are combined into a rating scale which measures the intensity of positive and negative affect. Greenberg et al. (1973), Lewis and Brooks (1972), and Morgan and Ricciuti (1969) have all used affect rating scales. However, there are several problems associated with these scales. Rating systems are often only a global evaluation of the infant's affect state and do not reflect the individual behaviors. For example, a rating scale does not tell us whether infants are more likely to cry, frown, or turn away from an approaching stranger. All it tells us is that there are varying degrees of negative or positive affect. Although two strangers are equally negative, the pattern of behaviors may differ. Attempts to create different scales only partially correct for this problem.

Furthermore, rating scales mask the percentage of infants who are exhibiting fear. For example, when Greenberg et al. (1973) used a 3-point rating scale, with 2 as a neutral point, the mean score for the adult condition was 2.05. This is clearly not negative. A similar finding is reported by Ricciuti (1974). We do not know how many infants were fearful in either study or how many infants differentiated between children and adults in the former study. The report of percentage of infants exhibiting specific behaviors presents a less distorted picture of social perception. Such an approach has been advocated by Masters and Wellman (1974) and Morgan (1973). Therefore, our analysis will present the percentage of infants exhibiting each specific behavior.

In addition, few fear studies have looked at the relationship of the various behaviors. The clustering of behaviors within a situation may be observed by constructing a behavioral profile for each social event. This should be done since one behavior may have different meanings for the infant in different situations or at different times. The meaning may only be inferred

by examining the interrelationships of behaviors within each situation. For example, in a study on infants' responses to pictures of familiar and unfamiliar persons, we found that high fixation scores were characteristic of the mother and adult stranger conditions even though infants were more likely to smile and reach toward the picture of mother than that of the adult stranger (Brooks & Lewis, 1974; Lewis & Brooks, in press). Thus, the relationship between looking and affect was contingent on the stimulus condition. We hypothesized that even if differentiation of social events does not occur for a specific behavior, differences in the clustering of behaviors for each class of people may occur. For example, infants may move away from all strangers but may smile and move away from children and frown and move away from adults.

Differentiation by specific behavior

The percentages of infants exhibiting specific behaviors are presented in Figures 1 - 6. Five stranger conditions are represented--adult male, adult female, small adult female, child female, and child male.[3] In addition, the five distances at which each behavior was coded are also represented. Remember that the first 4 distances involved the stranger's approach while distance 5 was the stranger's departure.

Seven different behaviors were examined. These were behaviors that are typically used in studies of fear or wariness (Bronson, 1972; Greenberg et al., 1973; Lewis & Brooks, 1972; Morgan & Ricciuti, 1969; Scarr & Salapatek, 1970; Shaffran & Décarie, 1973; Sroufe et al., 1974), and they include 1) smiling (broad smile and slight smile combined), 2) frowning (slight frown and broad frown combined), 3) avoiding the stranger's glance, 4) crying, 5) moving towards the stranger, 6) moving away from the stranger, and 7) freezing or ceasing activity. Since

there were few instances of crying (less than 5%), these data are not presented in pictorial form. Figures 1 - 6 present the percentage of infants who smiled, frowned, averted their gaze, moved towards, moved away, and ceased moving as the stranger approached.

Stimulus condition effect

A non-parametric test, the Cochran Q test (Siegel, 1956), was used to see whether the percentage differences among stranger conditions were significant. Since only 58% of the infants received the male adult condition, the tests for adult male-adult female differences only include 23 subjects. The effect of distance on differentiation was also tested. Thus, for each behavior, two Q tests were performed--one for distances 1 and 2 and one for distances 3 and 4. Distances 1 and 2 are termed distal, 3 and 4 proximal.

Insert Figure 1 about here

Smiling. As can be seen in Figure 1, the infants were more likely to smile at the approaching children than at the adults. Approximately 40% of the infants smiled at each of the children at least once during the approach while only 10-15% smiled at the adults. Infants smiled differentially from the beginning of the observation, as the differences among strangers were significant for the distal ($Q_{(3)} = 16.02$, $p < .01$) as well as the proximal ($Q_{(3)} = 13.64$, $p < .01$) distance.

Insert Figure 2 about here

Although infants discriminated among the stranger conditions, they did not smile differentially to the male or female children or to the male or female adults as tested by the McNemar test of significance.

Frowning. Frowning behavior exhibited just the opposite pattern found for smiling. More infants frowned at the adults' approach than at the children's approach (distal: $Q_{(3)} = 7.29$, $p < .10$; proximal: $Q_{(3)} = 10.91$, $p < .02$). There were few instances of frowning in the presence of the children. The infants differentiated between adult strangers as well as between adults and children. The adult differentiation seemed to be based on gender, as more infants frowned at the male than at the female adults (distal: $Q_{(2)} = 7.20$, $p < .05$; proximal: $Q_{(2)} = 6.00$, $p < .05$). This was not the case for the children.

Directionality of body movement. Of the six different movement behaviors scored, three were movements toward and three were movements away from the approaching stranger. The percentages of infants exhibiting such movements are presented in Figures 3 and 4. As can be seen, the frequency of occurrence

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Insert Figures 3 and 4 about here

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was quite low, as the infants tended not to move at all. This will be most obvious when we discuss the activity levels of the infants. None of the infants moved towards the adult male or small adult female, while a few moved towards the other three strangers. The most forward movement was elicited by the female child, as one-quarter of the infants moved towards her sometime during the trial. Differences among the groups were significant for both the distal ($Q_{(3)} = 9.33$, $p < .05$) and proximal ($Q_{(3)} = 9.32$, $p < .05$) distances.

Movements away from the approaching strangers occurred more frequently than did movements toward the strangers. Approximately 20% moved away from the children and small adult, and 40% away from the normal-sized adults during the entire approach. However, differences among stranger conditions were not significant.

There were no significant sex of stranger differences for the two directionality of body movement categories.

Insert Figure 5 about here

Gaze aversion. Figure 5 presents the percentage of infants who averted their gaze from the approaching stranger. Infants avoided looking at the male and female adults but not at the children or the small adult. At one time or another during the approach, half of the infants averted their gaze from the approaching adult male and 88% from the adult female, while less than 10% of the infants did so for the child and small adult conditions. The stranger effect was highly significant at both distances (distal: $Q_{(3)} = 27.15$, $p < .001$; proximal: $Q_{(3)} = 68.06$ $p < .001$). There were no significant gender differences for either adults or children.

Insert Figure 6 about here

Activity cessation. The infant's activity level was rated at each distance. The percentage of infants who did not move is presented in Figure 6. Infants were, in general, likely to exhibit little or no activity in the presence of the strangers. Most infants stopped moving sometime during each trial. The infants were most likely to stop moving in the presence of the children and small adult and least likely to do so in the presence of the two normal-sized adults. The difference among strangers was only significant for the distal distance ($Q_{(3)} = 10.78$, $p < .02$).

Infants tended to stop moving more when the male rather than the female child approached (McNemar test: distal: $X^2 = 4.90$, $p < .05$; proximal: $X^2 = 4.00$, $p < .05$).

Sex of stimulus effect

As was seen in Figures 1 - 5, the infants were generally not differentiating within age classifications on the basis of gender. The responses to the male

and female children were remarkably similar. Infants differentiated between the children's gender only on the basis of cessation of activity. The percentage of infants who exhibited no activity was higher toward the male than the female child as tested by the McNemar test of significance (distal: $X^2 = 4.9$, $p < .05$; proximal: $X^2 = 4.0$, $p < .05$). Infants seemed more likely to differentiate between the adult male and female than between the male and female children. They tended to respond most negatively to the adult male: more infants frowned at and moved away from, and fewer infants smiled at and moved towards the adult male. However, these differences were not significant.

The effect of distance

The effect of distance on stranger differentiation has been found in studies utilizing rating scales (Lewis & Brooks, 1972; Morgan & Ricciuti, 1969). Therefore, we were interested to see whether this would occur when the effect of distance on the frequency data was analyzed. Differences among the four distances for each stranger condition were tested by Cochran Q tests. The approach of the adult strangers, but not the child strangers, resulted in the increase in the occurrence of several behaviors. The incidence of frowning increased as the adult strangers approached. This was significant for the adult female ($Q_{(3)} = 8.23$, $p < .05$) and the small adult ($Q_{(3)} = 13.10$, $p < .01$) but not for the adult male stranger. There were no distance effects for smiling, however. In terms of directionality of body movement, distance effects were also found for the negative but not the positive behaviors. As can be seen in Figure 4, moving away from the adults tended to increase with proximity. This distance effect was significant for the small adult ($Q_{(3)} = 13.77$, $p < .01$) and the adult female ($Q_{(3)} = 11.94$, $p < .01$) but not for the adult male condition. Gaze aversion, which was only exhibited in the presence of normal-sized adults, also increased with proximity, as is seen in Figure 5. The effect was significant

for the adult female ($Q_{(3)} = 18.03$, $p < .001$) and nearly so for the adult male ($Q_{(3)} = 7.61$, $p < .10$). Although cessation of activity tended to increase with the approach of all five strangers, the distance effects were not significant.

Thus, the occurrence of the more negative behaviors, i. e., frowning, gaze aversion, and moving away tended to increase with proximity. In addition this effect was only found for the adult strangers.

The infants responded differently to the approach and departure of the strangers. In general, the infants seemed to respond as soon as the strangers walked into the room. This is especially true for the attentional or orienting behaviors (e. g., looks continuously, ceases activity, and concentrates.) The infants immediately quieted and stared as each stranger opened the door and entered. The entrance may be seen as the beginning of an intrusion, as the incidence of frowning, moving away, and averting the gaze of the adults rapidly increased with the approach. As soon as the adult strangers turned to leave there was a decrease in these three behaviors. However, there was one interesting exception: the infants were equally likely to frown at the adult male during the approach and departure. In general, then, the approach and not the presence of the adult strangers served to elicit frowning, moving away, and gaze averting. Interestingly, smiling, which was primarily elicited by the children, did not decrease with departure.

Age of subject differences

Since the stimulus effects already discussed may not have occurred for the entire sample, the effect of subject age was examined. Specifically, we were interested in whether the youngest subjects were responding differentially and exhibited the patterns of responses which characterized the sample as a whole. Therefore, the responses of the six youngest infants, who were 7-8 months of age, were examined and are presented in Table 3. Table 3 includes the percentage

Insert Table 3 about here

of infants exhibiting the seven behaviors at distance 4 (touch). As can be seen, the 7-8 month olds exhibited the same differential pattern of responding found for the entire sample. They were more likely to smile at and move towards the children, while more likely to frown at and move away from the three adults. In addition, gaze aversion was only found in the presence of the normal-sized adults. Thus, as early as 7-8 months infants show differential behavior toward these social events.

Sex of subject differences

To see whether the male and female infants responded differently to the strange persons, a series of Chi-square tests were performed. In general, there were no significant differences between the male and female subjects in terms of the frequency data. However, the female infants tended to be more fearful of the adult male than were the male infants.

Behavioral profiles and discrimination

In addition to an analysis of specific behaviors, we were interested in the clustering of behaviors within each stranger condition. Thus, a behavioral profile which included the percentage of infants exhibiting a number of behaviors was compiled for each stranger condition. The profiles for the child, small adult, and normal-sized adult strangers at distance 4 are presented in Figures 7, 8, and 9, respectively. Gender differences are indicated on the figures for the child and adult stranger conditions.

Insert Figures 7 - 9 about here

Child conditions

As can be seen in Figure 7, the most frequent response to the male and female children approaching and touching the infant's hand may be characterized as an orienting

or alerting response. In the female child condition, the most prevalent behaviors were activity cessation, looks continuously, no vocalization, and an attentive facial expression. This high degree of attention was not coupled with negative affect, as gaze aversion, frowning, and moving away were virtually nonexistent. Positive affect, however, did occur, although only one behavior--smiling--occurred with any frequency.

The pattern for the male child was remarkably similar. Over 60% of the infants were not moving or vocalizing and over 85% looked at him continuously. This was accompanied by an attentive facial expression. As in the female child condition, there were few instances of gaze aversion or frowning. The incidence of smiling was higher, though, as 20% of the infants smiled when the male child touched their hand. Thus, the approach of the children elicited much attention and some smiling and little gaze averting or frowning.

Small adult condition

High attention was also elicited by the small adult. Infants did not vocalize or move, but instead watched the approach intently. In fact, none of the infants averted their gaze or even looked away from the small adult. However, the orienting response was not associated with positive affect as was found in the child conditions. Not one infant smiled or moved toward the small adult. However, some of the infants exhibited negative behavior, as one-fifth of the sample frowned or moved away.

Normal-sized adult conditions

A still different pattern was found for the approach of the adults. (See Figure 9). The orienting or attentional response, so prevalent in the former conditions, occurred less frequently during the adult condition. In the female adult condition, few infants vocalized, only 50% looked continuously or intently, and only 40% remained still. The lower incidence of orienting was related to an increase in the occurrence of negative affectual behaviors. 70% of the

sample exhibited at least one negative behavior to the female adult. 40% averted their gaze, 16% moved away, 22% frowned, and 5% cried. There were few instances of positive responding.

A similar pattern was found for the adult male condition. Even fewer infants displayed the orienting reaction to the adult male than to the adult female. Although almost 70% watched his approach without looking away, only 43% displayed a concentrate expression and only 22% ceased moving. The lower rate of attending was coupled with a relatively high incidence of negative affect. Almost 40% of the infants frowned, 27% moved away, and 27% averted their gaze. At least one of these behaviors was exhibited by over half of the infants. Positive behaviors, i.e., smiling, cooing, and moving towards the adult male, occurred infrequently. Thus, the adult male elicited negative affect in about half of the infants and positive affect in none of the infants.

Discussion

Infants respond differentially, and at times with fear-like behavior, to unfamiliar persons. The central issue of our study--whether facial configuration or height are utilized by the infant to respond differentially to children and adults--has been explored but only partially explained. Using a number of behaviors (attentional and affectual), the infants' responses to approaching children and adults of varying heights were shown to differ. The responses to the three categories of persons were all somewhat different from one another. The infants did not treat the small adult like a child or a normal-sized adult.

When affect is considered, infants discriminated between adults and children, suggesting that facial configuration was a relevant factor. Specifically, the infants smiled and moved toward the approaching children, but frowned and moved away when the three adults approached. Few instances of smiling at or

moving towards the adults or frowning at the children were found. Thus, on the basis of behaviors typically observed in the fear of stranger paradigm, we would state that infants were responding to facial configuration, not size.

The so-called affective behaviors do not tell the whole story however. The infants did discriminate among the adult strangers on the basis of height. We have found that the most prevalent response to the stranger approach, in terms of frequency of occurrence, was an orienting reaction, similar to that described by Sokolov (1963) and Lewis (1970). When confronted with a novel stimulus, in this case a strange person, the infant typically ceases moving, opens his eyes wide, and watches intently or "stares." In fact, our infants were most likely, in all conditions, to watch intently (i. e., look continuously with an intent or concentrative expression) while not moving or vocalizing. However, this reaction occurred less frequently in the presence of the normal-sized adults than the children or small adult. For example, all of the infants looked at the small adult continuously, 85% at the children, and only 52--68% at the normal-sized adults. Thus, attentive behaviors differentiated between short and tall persons.

Interestingly gaze aversion, which may be classified as both a negative affectual and an attentional behavior, also discriminated between strangers on the basis of height. Infants did not avert their gaze from the small adult or the children, but did from the other adults.

It seems that the infants were making three distinctions--child, small adult, and normal-sized adult. In general, the children elicited high attention, some smiling, and no gaze aversion, the adults less orienting or attention, high gaze aversion, and frowning and moving away, and the small adult continuous attention, no gaze aversion, and some frowning and moving away. Thus it seems that infants use neither size nor facial configuration independently when

responding to persons. In our study, height seemed to be related to gaze aversion, orienting, and affect while facial configuration was related to the nature of the affect (e.g., smiling and frowning). Thus, frowning and moving away only occurred in the three adult conditions while smiling and moving towards occurred in the presence of children. While gaze aversion was only exhibited to the normal-sized adults, the infants were clearly differentiating between child and adult as well as between short and tall adults.

Gender was hypothesized to be another social dimension which is discriminated by the young child. We wished to see whether male and female persons elicited different responses. However, the infants in our sample did not differentially respond to the male or female children or to adult men and women. This is puzzling in light of the findings of Benjamin (1961), Morgan and Ricciuti (1969), and Shaffran and Décarie (1973), who report that infants are more fearful of adult male than adult female strangers. This was also found in Greenberg's (1973) sample, although only his 12-month-old males responded differentially on the basis of gender.

What might be the cause of these discrepancies? Since our infants were discriminating child-sized and normal-sized adults, perhaps infants also respond to height differences in normal-sized adults. Since adult males are generally taller than females, the more negative affect may be related to height. To test this hypothesis, we noted the height of the adult strangers used by Morgan, Greenberg, and Shaffran (personal communication for each). All three of their studies had employed male strangers who were approximately 5'10" to 6'0" and female strangers who were 5'3" to 5'6". Obviously, height could be a relevant factor. In our two studies where no gender differences were found, the male and female adult strangers were approximately the same height (5'4" to 5'6"). When pictures of the faces of male and female adult strangers which had no height cues

were shown to 9- to 18-month-old infants, differential responding did not occur (Brooks & Lewis, 1974; Lewis & Brooks, in press). These findings suggest that height needs to be considered if we wish to explore gender differences.

As we stated earlier, the infants did not treat the small adult as a child (small with child face) or an adult (tall with adult face). This finding indicates that infants as young as 7-8 months have a schema for the relationship between height and facial configuration as well as for these social characteristics separately. This is not surprising since infants as young as one month have been shown to have a schema of the face-voice relationship (Aronson & Rosenbloom, 1971; McGurk & Lewis, in press; Lewis, Townes-Rosenwein, & McGurk, 1974). Thus, infants actively integrate social characteristics instead of differentiating them separately. And, as we have shown, integration of social objects appears very early. Since the young organism is clearly embedded in a social context, its survival may depend on such social responsivity. As a methodological note, these findings suggest that social dimensions must be studied within their social context and that the relationships of various features must be examined and systematically varied. Only then will the infant's perception of the social world be understood.

What do our findings mean for a theory of fear or for the more general issue of social behavior? First, consider the issue of the origins of fear. These data are not easily explained by either an ethological or incongruity hypothesis. Ethological theories which rely on the concept of strangeness <u>per se</u> as an elicitor of negative affect or "fear" obviously are not sufficient to explain differential responding to various classes of strangers. However, an ethological construct relating to size and strangeness of the approaching stimulus may be evoked. Given a stranger, the larger a person, the more threatening or fear-provoking he may be, which would account for the negative affect exhibited to the

normal-sized adults but not to the children. In the present study the child-sized adult also elicited negative affect, suggesting that the concept of size and strangeness as fear-elicitors is not sufficient or adequate.

The positive affect exhibited to the children might also be explained by another ethologically oriented position. Lorenz (1943) and Hess (1970) have suggested that the quality of "babyishness" may release protective or mother responses in adults. Thus, the facial configuration of the young would elicit more interest than that of older organisms. To support this theory, Hess (1970) cites evidence that pictures of babies are preferred to pictures of adults by adult persons, at least women (Cann, 1953; Hess, 1967). No positive affect was exhibited in the presence of the small adult, which is congruent with the theory that young facial figures control the positive class of affect. Perhaps a similar super optimal releaser exists for the young, although the function would presumably be different.

Seductive as these theories may be, at least two problems remain. First, if adult strangers are perceived as threats in terms of survival, one might expect a more active attempt to flee than was seen. Few infants cried, screamed, or attempted to escape from the approach of the adult. Adult strangers were more likely to elicit interest than fear. Second, infants were somewhat negative to the small adult who would not be perceived as threatening in terms of height.

The incongruity theory is even less persuasive. This theory asserts that events which are highly discrepant from past experiences or from an internal representation evoke negative affect. The infant presumably compares the strange person to an internal schema of a familiar person, specifically the mother (Hebb, 1946, 1949; Schaffer, 1966). If the mother is used as a referent, we would have to predict that the small adult and the children, being most discrepant, would elicit more negative affect than the adults. This is clearly not the case.

In an earlier paper (Lewis & Brooks, 1972), we presented a cognitive theory which explained the differentiation between child and adult by evoking the concept of self. This theory, like other cognitive developmental theories (Kohlberg, 1969) relies on the child's level of knowledge about the world to determine its social behavior. In this case the infant utilizes knowledge about itself, evaluates others as "like or unlike me," and reacts to the evaluation "like me" in a positive manner. Thus, the evaluation "like me" evokes approach behavior while "not like me" evokes withdrawal. The approaching child stranger, which may be seen as similar to one's self, elicits smiling while the approaching adult stranger, who is unlike the infant, elicits frowning or gaze aversion. The small adult, having features of both, elicits a combination of both in terms of their response. Physical characteristics of persons such as height and facial configuration are hypothesized to contribute to the evaluation of "like me."

However, the evaluation of social events is much more complex than the above theories suggest. Ethology, incongruity, self-concept--all are insufficient if considered without reference to other factors. Social responses to persons are based on a complex series of events which are influenced by past experience, the current contextual cues, cognitive capabilities, and species-specific predispositions. When a novel stimulus (which may be novel due to the context or to the object itself) is presented to the infant, the typical response is that of attention or orienting. Before the infant responds affectually, however, the stimulus must be evaluated. This evaluation might involve all the factors mentioned above. It seems clear that the infants' social behavior cannot be considered to emanate solely from the perceptual experience of the social object. A multitude of factors influence the infant's response and must be taken into account.

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[2]Since the infants responded most similarly to the two female children, the responses to the two children were combined.

[3]The infants' responses to the familiar adult female (greeter) were not included in the present report.

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Table 1

List of Coded Behaviors

Facial Expression	Vocalization	Activity Level
Broad smile	Laugh, giggle	No activity, cessation of activity
Slight smile	Coo, babble	Moderate activity
Concentrate, orienting face	No vocalization	High activity
Broad frown	Neutral vocalization	
Slight frown	Whine, whimper, fret	
	Cry, scream	

Attention	Direction of Eye Gaze: Part of the Stranger's Body on which S focused
Continuous attending	Head and upper torso
Attends most (over 50%) of the time	Feet
Attends briefly (less 50% of the time)	Scan from head to feet
Does not look	Scan from feet to head
	Hand: during touch
Looks at mother	
Alternates looking at mother and stranger	
Averts gaze from stranger	

Directionality of Body Movement

Movement toward:	No movement:	Movement away:
Movement toward the stranger: arms and torso	No movement where directionality could be specified	Movement away from the stranger: torso only
Movement toward the stranger: torso only		Movement away from the stranger: hand or arm only
Movement toward the stranger: torso or arm only		Movement away from the stranger: arms and torso
		Movement toward the mother: arms and torso

Table 2

Observer Reliability for 7 Behavior Categories

Behavior	Proportion of agreement
Facial expression	.88
Vocalization	.98
Directionality of body movement	.94
Activity level	.88
Direction of eye gaze	.95
Averts gaze	.91
Attention	.83

Table 3

Stranger Differentiation for the Six Youngest Subjects:

Percentage for Distance 4

Behavior	Stranger Condition				
	Child Male	Child Female	Small Adult	Adult Female	Adult Male
Smile	68	50	0	0	0
Frown	0	0	17	17	0
Avert gaze	0	0	0	83	75
Move towards	0	17	0	0	0
Move away	0	0	17	17	17
Freeze	68	50	68	68	40

Figure Captions

Figure 1. Percentage of subjects who smiled at the five strangers.

Figure 2. Percentage of subjects who frowned at the five strangers.

Figure 3. Percentage of subjects who moved towards the five strangers.

Figure 4. Percentage of subjects who moved away from the five strangers.

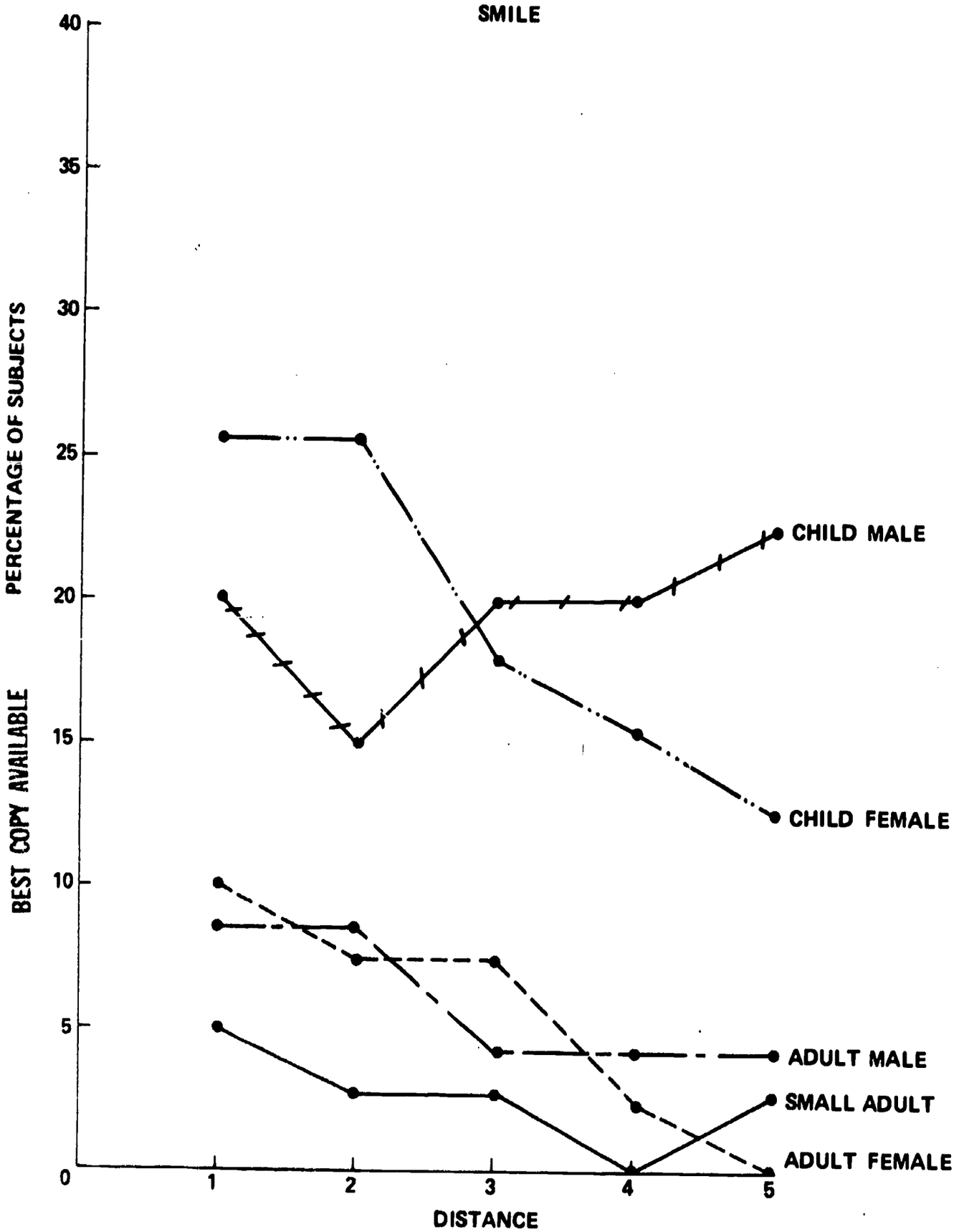
Figure 5. Percentage of subjects who averted their gaze from the five strangers.

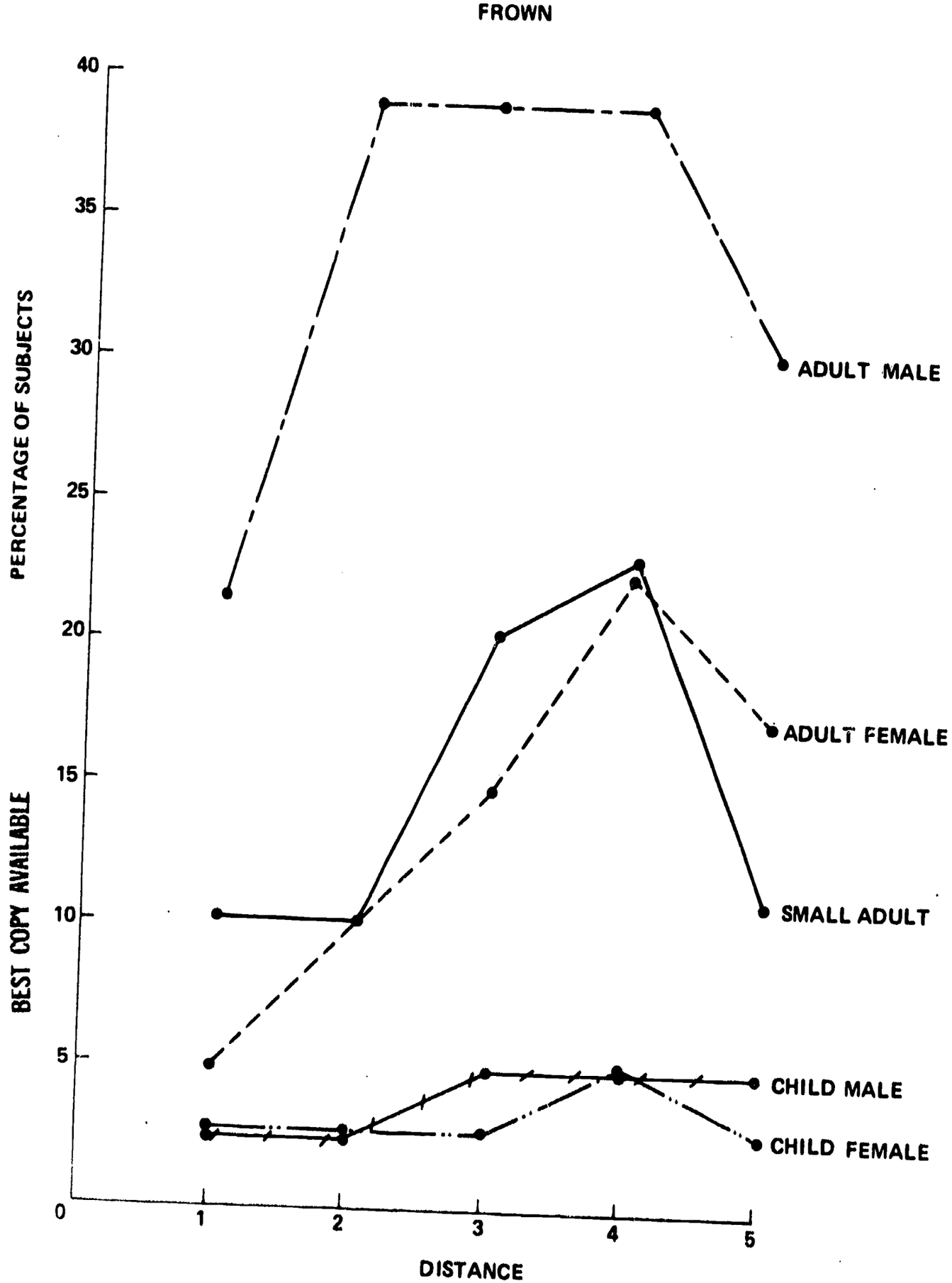
Figure 6. Percentage of subjects who ceased moving during the approach of the five strangers.

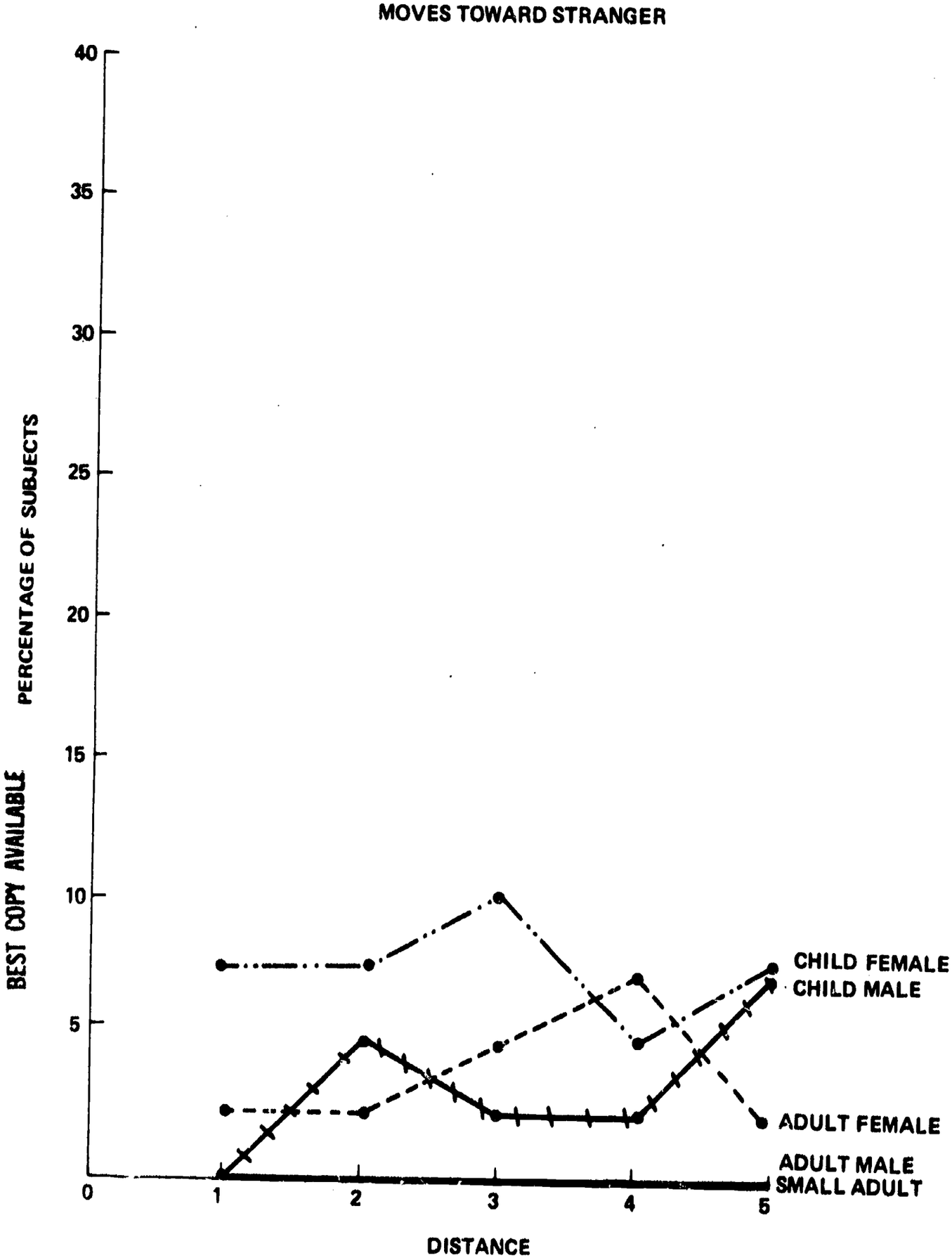
Figure 7. Behavioral profiles for the male and female child strangers at distance 4 (touch).

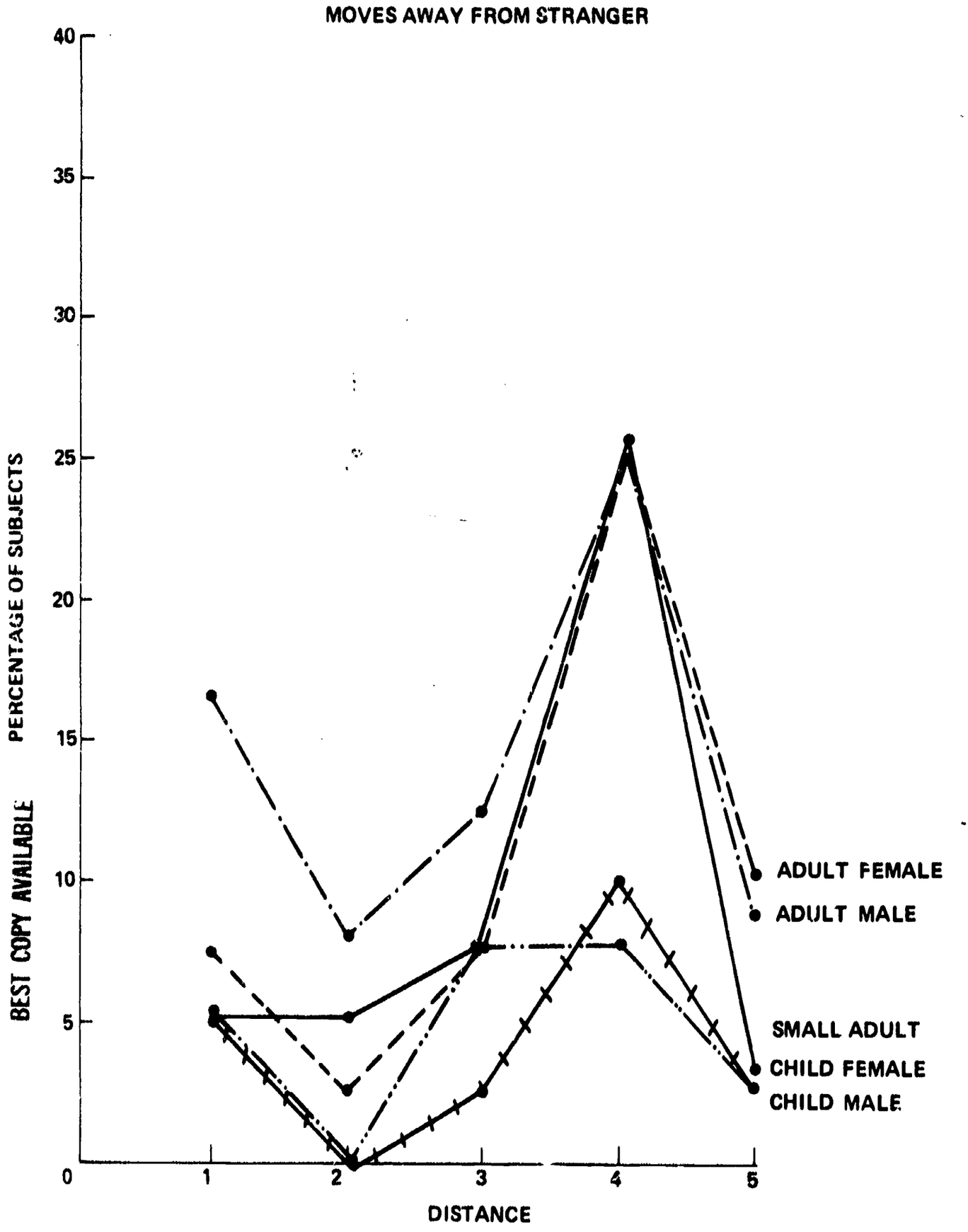
Figure 8. Behavioral profile for the small adult female at distance 4 (touch).

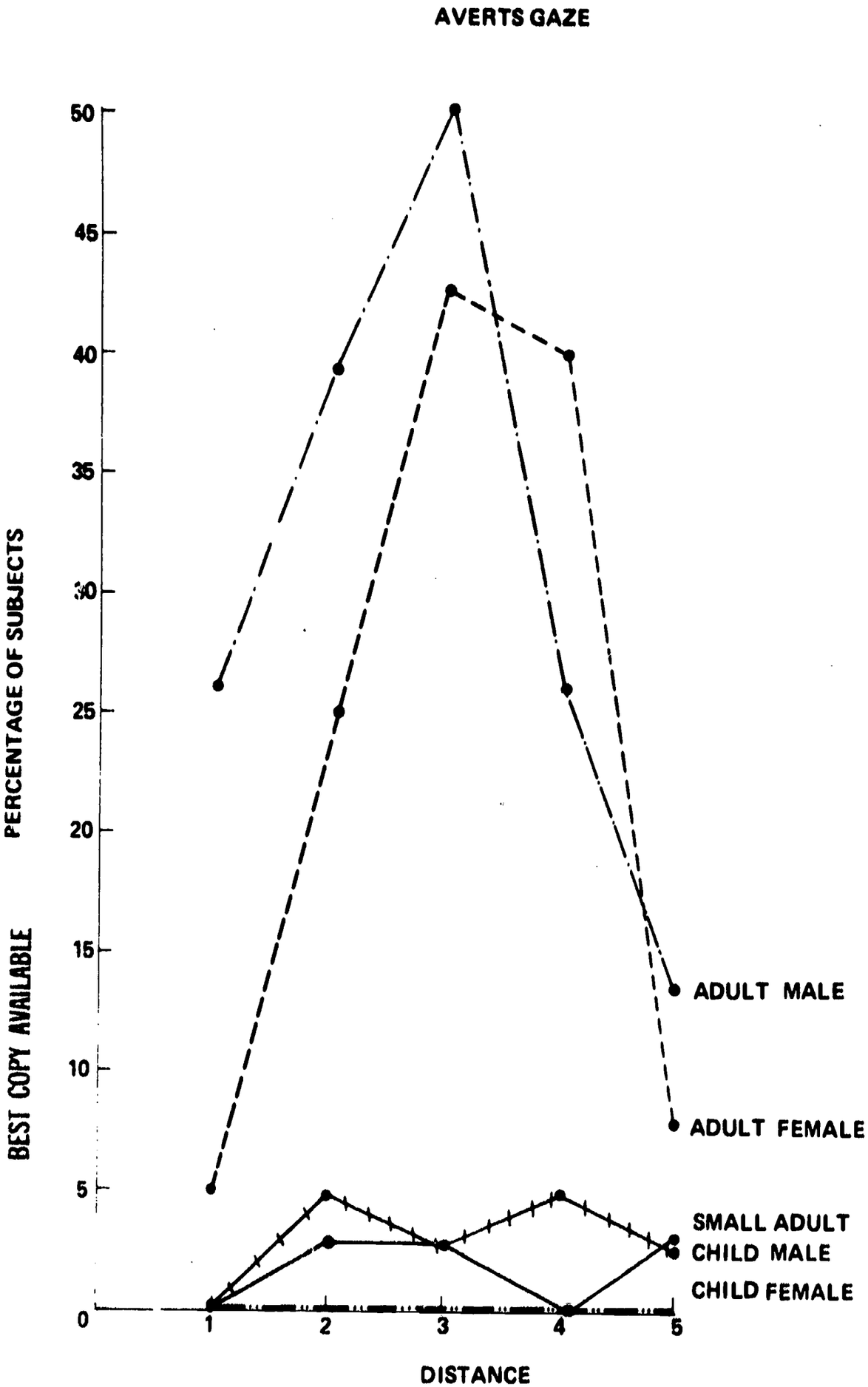
Figure 9. Behavioral profiles for the male and female adult strangers at distance 4 (touch).

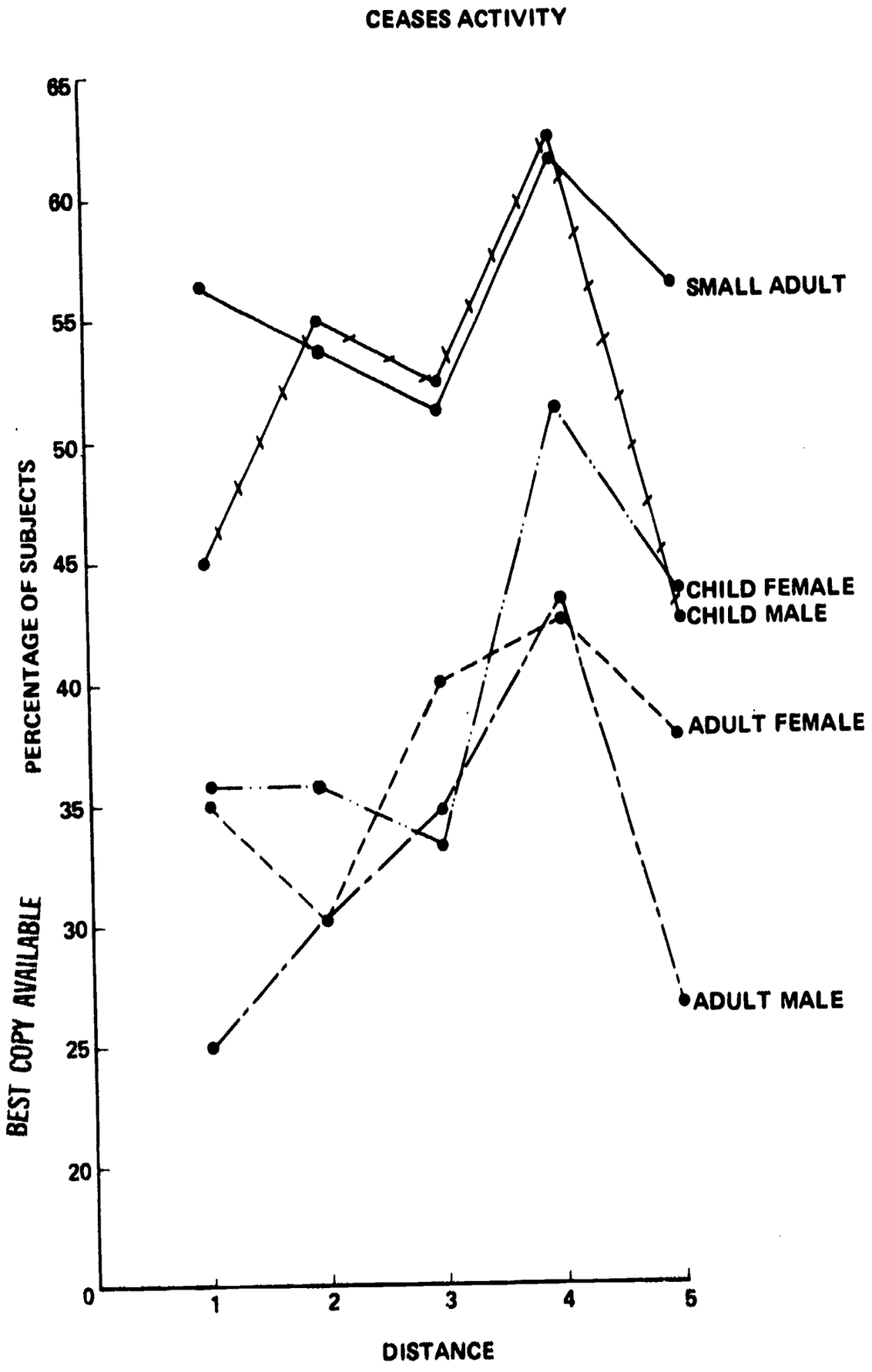


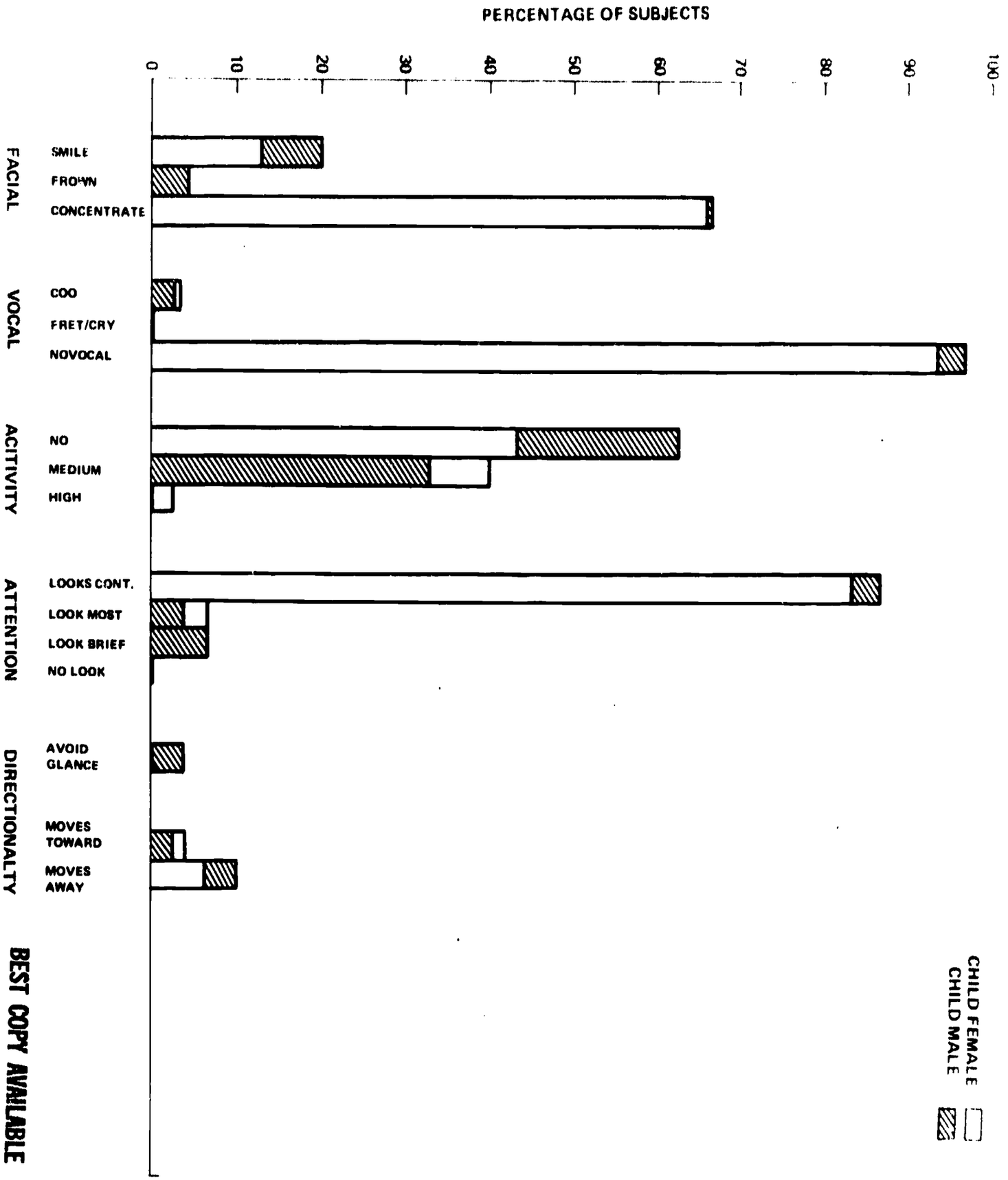


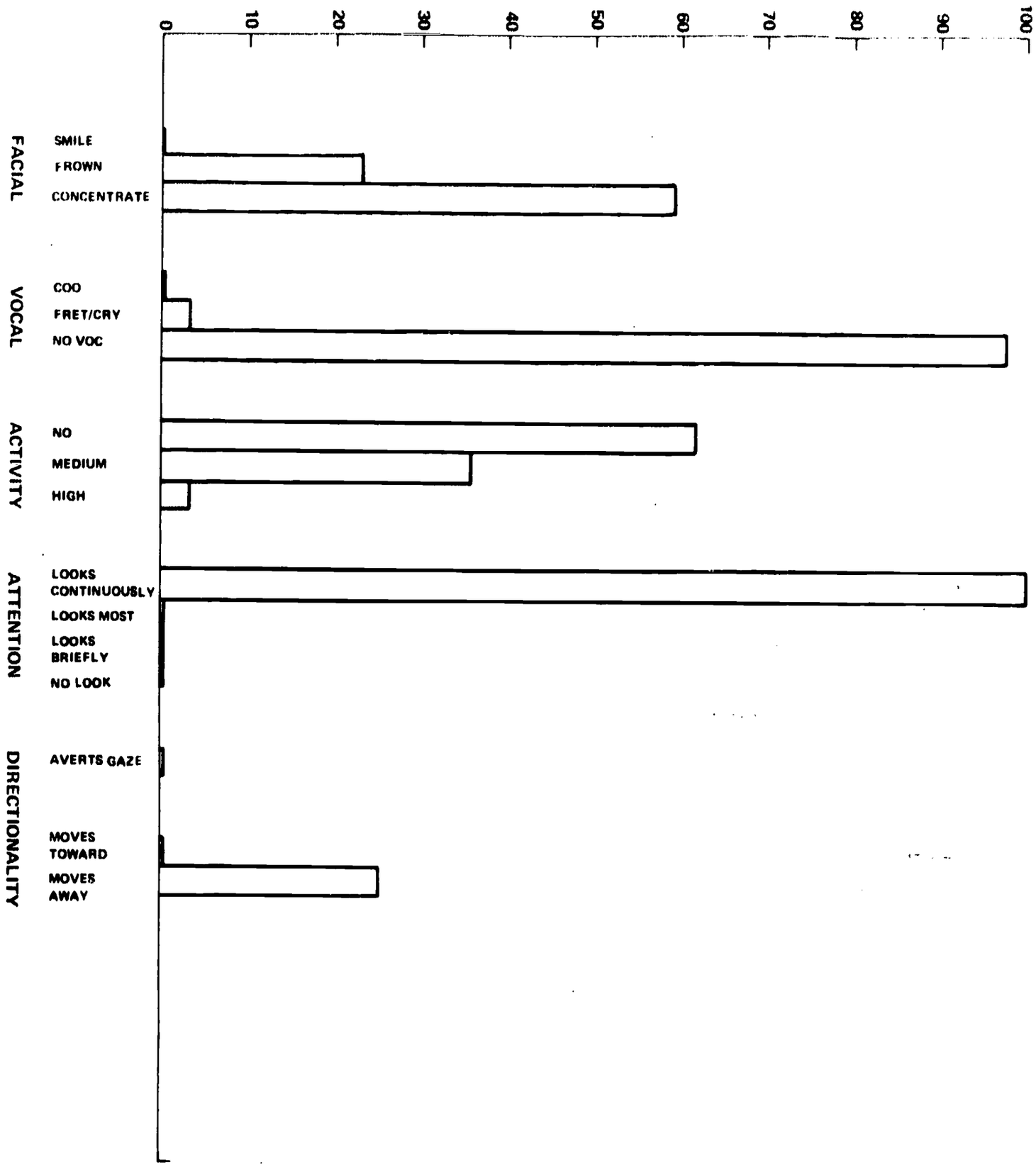


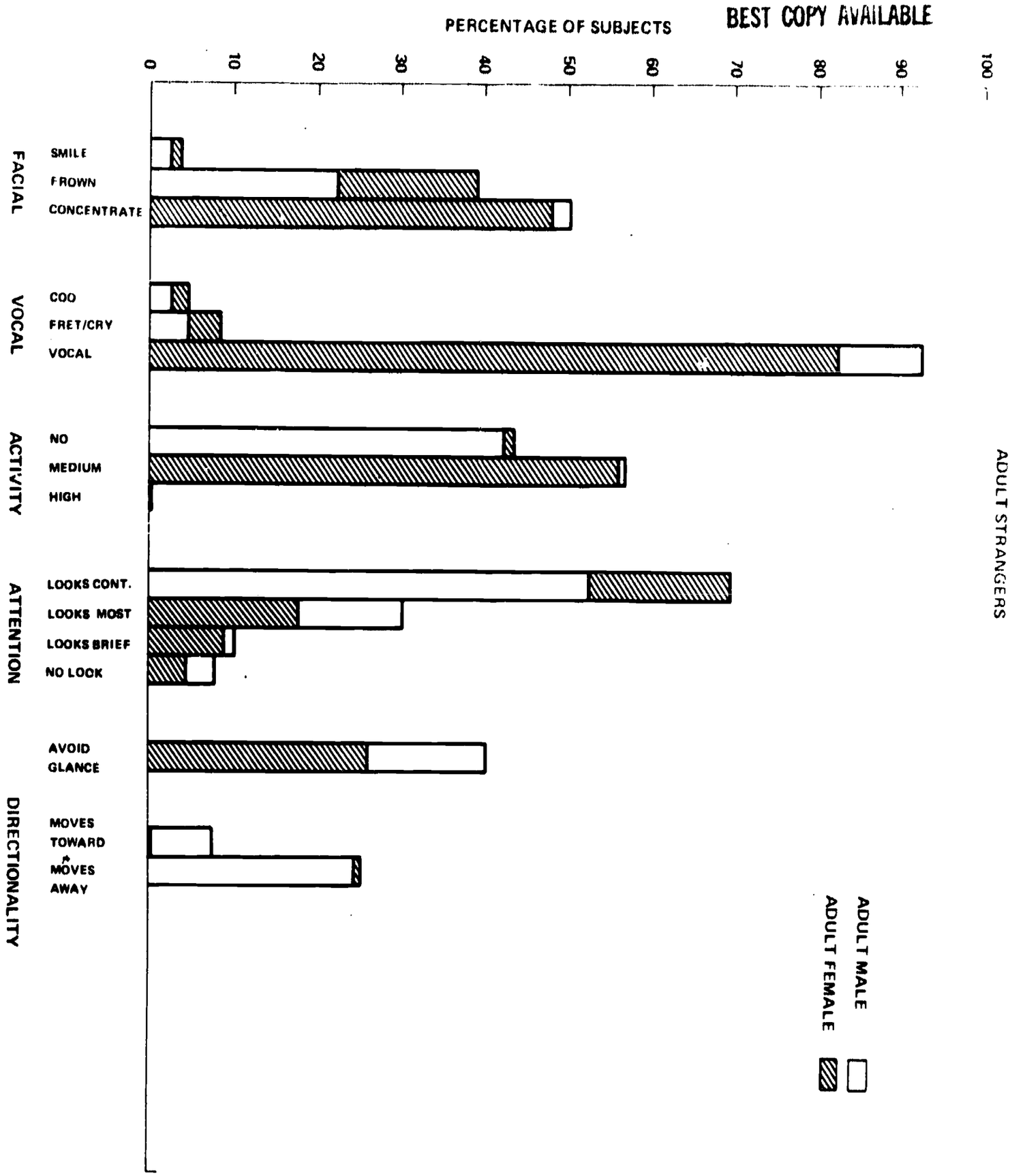












Peer group interaction in infancy

The infants' interactions with adults has been studied under the rubric of attachment. However, the literature has typically focused on the mother-infant relationship and has neglected other significant relationships. This study is an attempt to explore other significant infant relationships.

We were especially interested in infants' responses to other infants. There are few studies of peer group behavior in human infants (Bronson, 1972; Eckerman, 1973; Lee, 1973), as peer relationships have not been considered as important as adult relationships. The primate literature, however, has demonstrated the importance of peer-peer interaction and in fact has suggested that peers are able to substitute for adults quite well (Chamove, 1966; Harlow & Harlow, 1969). An understanding of the dynamics of peer interaction is of increasing importance today with the proliferation of day care in America. The importance of the peer group as a socializing agent has probably been underestimated.

The second study, then, is exploratory in nature. Infants' relationships with other infants was examined in order to 1) refine an observation technique for observing group interaction in infants, 2) discover developmental trends in peer interaction, and 3) further explore person differentiation.

Methodology and major findings will be presented. We are currently preparing a paper based on this data for publication.

Method

Experimental Procedure

Sixteen groups of four infants were observed. In eight groups the infants were 12-13 months of age; in the other eight they were 18-19 months of age. The age range within each group was always less than four weeks. Two males and two females were included in each group. The infants were relatively heterogeneous with respect to social class.

Each playgroup consisted of four infants who were brought to the laboratory by their mothers. The infants were greeted by and interacted with one experimenter to reduce exposure to strange adults. Each infant-mother pair was placed in a separate waiting room to eliminate interaction preceding the experimental procedure.

The following set of instructions was given to the mothers to read:

> One of us will accompany you and your child to the playroom when all the mothers and children have arrived and we are ready to begin. Please read these instructions while you are waiting to enter the playroom.
>
> We would like you to carry your child to the playroom and to sit in the chair marked with "your" color, holding the child in your lap. When you are all seated, we will knock on the mirror. This is your signal to put the child on the floor in front of your chair.
>
> Please do not initiate any action toward any of the children, but you may respond to them if they initiate the interaction. For example, if a child talks to you, you may answer, of if a child brings you a toy, you may play with it, but do not speak to the child or hand the child a toy first. We would prefer that you not leave your chair.
>
> However, it is possible that the children will start to hit each other or that one child will take a toy away from another. This is normal for children at this age, and again we would like you not to intervene until you feel the safety of your child is at stake. At that point you should go to your child and carry him or her back to your chair. Sit down and then place the child on the floor in front of you.
>
> The play session will last 15 minutes, and we will tell you when we are finished.

Then the mother was asked to pin two colored felt squares on her infant's shoulders. Each infant in the group was given a different color. Colors were assigned as a means of identifying the infants when they were together in the playroom.

An experimenter led the infants and mothers to a 10 foot by 14 foot carpeted playroom with two one-way observation mirrors. The playroom contained two sets of blocks, two pails, two sets of stacked rings, and two stuffed animals. Each mother sat in preassigned chairs marked with a piece of felt, the same color as had been assigned to their infants. The chairs were placed such that for each infant a child of the same sex and a child of the opposite sex were equally distant. Before she left the room, the experimenter introduced the mothers and infants to each other. The mothers held the infants on their laps until the experimenter tapped from behind a one-way mirror. On signal each infant was placed on the floor in front of its mother and was free to move around the room. Each playgroup was observed for 15 minutes. Afterwards, the mothers were asked to complete a general information questionnaire (see appendix).

Measurement

Insert Table 1 about here

Four observers, one assigned to each infant, coded the infants' behaviors from behind the one-way mirrors. A checklist of behaviors was marked every 10 seconds; this checklist is presented in Table 1. Eight behaviors were coded: look, touch, proximity,

smile, offer toy, take toy, hit, and share. Operational definitions of the behaviors are included in Table 1. The toy behaviors were marked in such a way to indicate whether the child initiated the behavior (I) or was the recipient of the behavior (R). Thus it was possible to separate out two instances of take toy--those in which the child accepts (referred to as accept toy) a toy offered by another child and those in which the child grabs (referred to as take toy) a toy from another child. It was also possible to distinguish two instances of offer toy--those in which the toy was offered and taken and those in which it was offered but refused. In addition to marking behaviors, the observers coded the person (social stimulus) to whom the behavior was directed--whether mother, adult, or peer. In addition, it was noted to which of the three infants the behavior was directed. Thus, four affiliative behaviors--look, touch, proximity to, and smile--and four play behaviors--offer toy, take toy, hit, and share--were observed. The frequency with which each of these was directed toward the mother, adult female strangers, and unfamiliar peers was examined.

Activity rating scores were computed for each of the infants at the end of the play session. First, each infant was rated within the group, with a 4 denoting the most active and a 1 the least active infant. An overall activity score was then given to each infant, the range being 2 (no movement) to 14 (constant movement).

Reliability

A fifth observer, who was present for 12 of the playgroups, made reliability checks three times for each of the four observers. Reliabilities based on total number of agreements/total number of agreements and disagreements

were calculated. If the frequency of occurrence was less than 5, no reliability was computed. The proportion of agreements is presented by behavior and by observer in Table 2. In general, the reliabilities are quite high, both within and across observers. No observer was consistently low, and agreement across behaviors was also good, with the most disagreements occurring with the adult- and peer-directed looks.

Insert Table 2 about here

Results

Differences in social stimuli

One of the primary questions of the study was whether and in what ways infants respond differentially to their mothers, adult female strangers, and peer strangers. Before any calculations were done to test for differences in response to the social stimuli, the frequencies of each behavior were made comparable. Since the social stimuli consisted of three adult strangers, three peers, and one mother for any subject, it was necessary to divide the adult stranger and peer data by three. An additional adjustment was made for two of the behaviors--proximity and touch. Since proximity and touch were double scored during data collection (i.e., the behavior was coded regardless of whether the subject initiated or was the recipient of it), these data were further divided by two.

Insert Table 3 about here

The mean amounts of looking, smiling, proximity, and touching directed to each of the three social stimuli are presented in Table 3. The results

show that children as young as one year of age did respond differently to the mothers and the strangers. The infants were most likely to interact with their mothers through proximal modes of behavior. The infants stayed closer to their own mother than to either group of strangers ($F_{(2, 126)} = 134.41$, $p < .001$) and they touched her more frequently. Physical contact was not exclusively directed to the mother, however. The infants also touched and approached the other infants, although less frequently than their mothers. The adult female strangers were not the recipients of any proximal contact.

Preferred contact with the mother was not exclusive, however. At both ages the infants looked more often at their peers than either their mothers or the adult strangers ($F_{(2, 126)} = 140.76$, $p < .001$). And the infants tended to approach their peers more often than the adult strangers ($F_{(2, 126)} = 134.41$, $p < .001$), and to smile more at the former ($F_{(2, 126)} = 4.09$, $p < .02$).

This suggests that the infants were responding differently to the child and adult strangers as well as to their mothers and the strangers. Strangeness *per se* cannot account for the results. While proximal contact was maintained with the mother, the infants displayed curiosity toward their peers by looking at and occasionally moving closer to them. In general, the presence of the adult strangers was ignored.

Toy play presents a similar picture, as infants were more likely to offer toys to their mother than the others but were also more likely to offer them to the child rather than the adult strangers ($F_{(2, 126)} = 19.91$, $p < .001$). However, they were more likely to grab toys away from their peers than from either group of adults ($F_{(2, 126)} = 11.55$, $p < .001$).

Age differences

The 12- and 18-month-old infants responded somewhat differently to their mothers and the strangers. Although there were no differences between the

groups on the two distal modes of contact--look and smile--differences between the 12-month-olds and 18-month-olds were observed on the proximal behaviors--proximity and touch. The older infants stayed closer to their mothers and touched them more often, while the 12-month-olds were more likely to be in proximity to and touching their peers than were the 18-month-olds.

Age differences in the toy behaviors were also found. The 18-month-olds offered toys more to their own mothers, while the 12-month-olds shared some of their offerings with their peers. In addition, the 18-month-olds took toys from peers and their own mothers more frequently than the 12-month-olds. No age differences were observed with regard to hitting (a low frequency behavior) or sharing.

Sex differences in peer preferences

Another question of interest was whether the infants would show a preference for playmates of the same sex or the opposite sex. Since for any particular child in each group there were two infants of the opposite sex and one of the same sex, it was necessary to make the same-sex and opposite-sex data comparable. The data collected on the infants of the opposite sex were combined and divided by two. The mean data are presented in Table 4.

Insert Table 4 about here

As can be seen in Table 4, there were sex differences in peer preferences in both affiliative and toy behaviors. This was most pronounced for the girls, as they were more likely to interact with their same-sex peers than with the opposite-sex ones. The girls touched, were in proximity with, and looked at the other girls more often than at the boy peers. An examination of

the mean data indicates that this occurred for the girls at both ages and was not due to sex differences in activity levels. The boys did not exhibit this preference for same-sex peers.

Since so few instances of toy behavior were observed at either age, there are few consistent sex differences in toy play. Girls were more likely to offer toys than boys and toys were taken more from the girls than from the boys. However, no same-sex peer preferences were found for the toy play behaviors.

Relationships among the behaviors

Insert Table 5 about here

To investigate the relationships among the behaviors, Spearman rho rank order correlations were computed and are presented in Table 5. Not surprisingly the highest relationships among the affiliative behaviors are between touch and proximity. The rho's range between .21 and .81, with the highest ones relating touch and proximity to the same social stimulus. Infants who stayed close to and touched their mothers frequently were not likely to seek proximity to or to touch other persons. Essentially, there was no relationship between the distal and proximal behaviors.

The relationships between the attachment and the toy behaviors are also interesting. The child who looked at the strange adults was not likely to take toys (rho = -.43, $p < .001$). Otherwise, there seemed to be no relationship between looking and playing. Not surprisingly, the largest correlations were between the toy behaviors and proximity to the mother, as in infants who stayed close to their mothers tended not to play with their peers, while those who engaged in play with the other children left their mother to do so. The

infants played with their peers from a distance, as evidenced by the low relationship between proximal behavior and playing.

Two observations are of interest in the correlations of the toy behaviors with each other. First, the infants who offered toys were likely to be the ones who took toys frequently (rho = .45, $p < .001$). Secondly, there was a relationship between sharing and taking toys (rho = .44, $p < .001$), which suggests there may exist a fine line between sharing toys and taking toys during infancy. This may be the lesson the 18-month-olds had learned which caused them to stay close to their mothers and to interact less frequently with their peers than the 12-month-olds did. At 12 months of age, curiosity predominates over caution or wariness, and the 12-month-olds were more likely to leave their own mothers and to interact with their social environment. The 18-month-old infants had learned that other infants were not likely to return toys given to them and were, in fact, more likely to grab toys.

Activity-behavior relationships and background variables

The possible effects of activity level, prior experience, and background on the behavior observed in the playrooms were examined. Table 6 presents the Spearman rho rank order correlations for these variables.

Insert Table 6 about here

Again we see a dichotomy in the infants' behavior between looking and interacting. Infants who looked frequently at their peers were the least active in terms of their activity score (rho = -.52, $p < .001$). Moreover, the active infants were less often in proximity to their own

mother (rho = -.76, $p < .001$) and more likely to be in proximity to the adult strangers (rho = .47, $p < .001$) and to their peers (rho = .50, $p < .001$). The low activity infants, who tended to stay close to their own mothers, touched her frequently (rho = -.63, $p < .001$), while the peers were more likely to be touched by the high activity infants (rho = .50, $p < .001$). Not surprisingly, the most active infants engaged in the most toy and play activity (rho's range between .41 and .55 for offer toy, take toy, hit, and share; all p's $< .001$).

In general, the background variables such as social class, birth order, and time spent with other children were not related to the infants' behaviors in the playroom. Infants with fewer brothers and sisters looked more at their peers (rho = -.32, $p < .01$) and took toys more often from them (rho = -.30, $p < .01$). Prior play experience with children outside the family, however, was not related to behavior exhibited in the play group.

Discussion

That infants respond differentially to unfamiliar adults and peers as well as to their own mother has been demonstrated. Not only did infants differentiate among the three groups of persons in terms of a variety of behaviors, but they directed different types of behaviors to their mothers, the other adults,, and their peers. The proximal mode of contact--touching and proximity--were almost always directed towards the mother. In fact, infants spent on an average over half of the fifteen-minute play period in the proximity of their mothers. Infants also sought the proximity of their peers, although less frequently than their

mothers. They did not move close to the adult females, however. The infants also smiled at their own mothers more than at the strangers.

Looking, which may be considered a distal mode of contact, was most frequently directed at their peers, as the infants visually examined one another about 20% of the play period. Equal amounts of time (approximately 10% of the time) were spent looking at the familiar and unfamiliar adults.

Thus, the infants responded differentially to their mothers and the unfamiliar persons in terms of touching, smiling, and proximity. In addition, the unfamiliar adults and infants were treated differently as the infants looked at, touched, and remained in proximity to the latter longer than the former. These findings are congruent with other reported results. As discussed in the section on social perception and fear, child strangers elicit positive and adult strangers elicit negative behaviors during approach sequences (Brooks & Lewis, 1974; Greenberg, Hillman & Grice, 1973; Lewis & Brooks, 1972,1974). In addition, infants tend to respond more positively to pictures of children than to those of adults (Brooks & Lewis, 1974; Lewis & Brooks, in press). One would expect baby-adult differentiations to yield similiar results which, of course, was the case. Two other studies have also reported more interest in and more positive behavior directed toward infants than to adults. Lenssen (1973) observed two infants and their mothers and reports an overwhelming preference for the strange baby. Brooks and Lewis (1974) found that infants were more likely to smile and reach towards pictures of infants than pictures of older children or adults.

The preference for the mother, of course, is not surprising. The attachment literature typically compares the infant's responses to mother and adult female stranger and such maternal preferences are always found.

The peer group interaction was also of interest. As was seen in Tables 3 and 4, peer-peer interaction was not frequent, although it did occur. Infants were most likely to look and to seek proximity of their peers. Smiling and touching occurred, but less frequently. Interactions involving the toys also were found with grabbing, sharing, and offering the toys being most prevalent. Eckerman (1973) reports similar peer-peer interactions.

There were also age of subject differences in play behavior, with the 18-month-olds being less likely to touch or remain in proximity with their peers than the 12-month-olds. Taking toys away from another was more likely to occur in the older group. We suggested that the 18-month-olds may have learned that other infants do not return toys as do their mothers and therefore are less likely to interact with other infants. When they do interact, they tend to grab toys.

Infants also involved their own mothers in toy play, usually in the form of offer toy. In fact, infants offered toys to their mothers more often than they did to their peers. This is congruent with Rheingold's (1973) finding that almost all infants spontaneously show or give toys to their mothers in a free play setting.

Birth order and sex of subject, as well as age, affect peer interaction. There was a tendency for all infants except the 18-month-old males to interact with same-sex peers more than with opposite-sex ones.

We have hypothesized that gender is a relevant social dimension for the infants--one that is used to categorize the social world. Furthermore, it has been suggested that infants perceive their own gender, as well as the gender of others. A preference for their own gender would lead to a preference for same-sex social objects. This hypothesis is partially supported by this study and by another study in which infants looked at pictures of same-sex infants longer than opposite-sex ones.

Thus, the four aims of our work on peer group interaction in infancy were met. First, an observation technique was developed which lends itself to the study of both peer group interaction and person differentiation. Second, our behavior checklist was shown to be highly reliable and may be adapted to a variety of situations. Third, developmental trends in peer interaction in the one- to two-year-old infant were traced, as the 12- and 18-month-olds were found to differ in terms of their peer-peer interactions. Fourth, person differentiation was explored using the peer play group observation technique. We found that infants interacted with their mothers, unfamiliar peers, and strange adult females differently.

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TABLE 1

List of Behaviors for the Play Group Study

Affiliative behaviors

TOUCH:	A touch must result in physical contact with any part of the body.
PROXIMITY:	A person is considered to be in proximity to the target infant if he or she is within three feet of the target.
LOOK:	A look is said to occur if the target baby is focused on the face or the head of a person. If the target baby is looking across the room, the head must be turned toward a person.
SMILE:	A smile is coded when the target baby's head is turned toward a person across the room or when the target baby's gaze is focused on a person's face or head.

Toy behaviors

OFFER TOY:	Offer toy is coded in four instances: (1) the target baby extends his arm with a toy in his hand toward a person; (2) the toy touches a part of the recipient's body; (3) the toy is pointed in the direction of a recipient who is across the room; and (4) the toy is put in another's lap, hand, or arm.
TAKE TOY:	There are two categories of take toy. The first involves taking a toy which has been offered. The second is grabbing or attempting to grab a toy from the hands of another person. Physical contact with the toy is necessary for a score in either category.
HIT:	Hit is generally defined as any aggressive act directed toward another person. This would include such behaviors as hit, scratch, bite.
SHARE:	Share is considered any cooperative interaction centering around a common toy. Examples include putting blocks in the same pail, stacking rings on one pole, examining and touching one toy.

TABLE 2

Mean Proportion of Agreements by Observer and Behavior

Behavior	Observer	1	2	3	4
Mother-directed					
	Look	.89	.94	.86	.88
	Touch	.91	.93	.93	.99
	Proximity	.86	.94	.94	.97
	Smile	.97	.97	---	---
Adult-directed					
	Look	.80	.81	.74	.70
	Touch	.99	---	---	---
	Proximity	.94	.90	---	---
	Smile	---	.96	.92	.94
Child-directed					
	Look	.79	.85	.82	.80
	Touch	.99	1.00	---	.98
	Proximity	.94	.87	---	.90
	Smile	1.00	1.00	.97	.98
	Offer toy	---	.99	---	---
	Take toy	.99	.99	---	.90
	Hit	.99	1.00	---	---
	Share	.99	.99	---	.99

TABLE 3

Affiliative and Play Behaviors Directed Toward the Mother, Adult Female Strangers, and Unfamiliar Peers

Behavior	Stimulus condition		
	Mother	Adult Female	Unfamiliar Peer
TOUCH:			
12-month-old	199.38	3.19	9.66
18-month-old	360.94	0.63	2.94
Total	280.16	1.91	6.30
PROXIMITY:			
12-month-old	435.00	11.84	69.94
18-month-old	572.50	13.91	42.53
Total	503.75	12.88	56.23
SMILE:			
12-month-old	12.19	5.28	6.63
18-month-old	10.31	4.81	7.09
Total	11.25	5.05	6.86
LOOK:			
12-month-old	104.06	94.16	230.53
18-month-old	98.75	88.66	240.63
Total	101.41	91.41	235.58
OFFER TOY:			
12-month-old	16.56	1.53	5.56
18-month-old	32.50	1.13	6.50
Total	24.53	1.33	6.03
TAKE TOY:			
12-month-old	0.94	0.09	8.78
18-month-old	12.19	1.31	13.44
Total	6.56	0.70	11.11

TABLE 4

Affiliative and Toy Behaviors Directed
to Same-sex and Opposite-sex Peers

Behavior	Stimulus condition	
	Same-sex peer	Opposite-sex peer
TOUCH:		
12-month-old male	29.38	18.75
12-month-old female	20.63	16.88
12-month-old total	25.00	17.81
18-month-old male	0.63	6.88
18-month-old female	11.88	4.69
18-month-old total	6.25	5.78
PROXIMITY:		
12-month-old male	241.25	205.00
12-month-old female	218.13	175.94
12-month-old total	229.69	190.47
18-month-old male	43.75	88.44
18-month-old female	171.88	108.44
18-month-old total	107.81	98.44
SMILE:		
12-month-old male	5.63	5.63
12-month-old female	7.50	8.13
12-month-old total	6.56	6.88
18-month-old male	5.00	11.25
18-month-old female	10.00	5.63
18-month-old total	7.50	8.44
LOOK:		
12-month-old male	330.00	346.25
12-month-old female	353.13	322.82
12-month-old total	341.56	334.53
18-month-old male	370.63	402.19
18-month-old female	420.50	252.19
18-month-old total	386.56	327.19

TABLE 4 (continued)

	Same-sex peer	Opposite-sex peer
OFFER TOY:		
12-month-old male	5.00	3.13
12-month-old female	6.25	8.13
12-month-old total	5.63	5.63
18-month-old male	3.13	4.69
18-month-old female	12.50	7.50
18-month-old total	7.81	6.09
OFFER TOY - REFUSED:		
12-month-old male	3.13	2.19
12-month-old female	4.38	6.88
12-month-old total	3.75	4.53
18-month-old male	2.50	2.81
18-month-old female	11.25	5.63
18-month-old total	6.88	4.22
OFFER TOY - ACCEPTED:		
12-month-old male	----	1.25
12-month-old female	0.63	0.63
12-month-old total	0.31	0.94
18-month-old male	----	2.19
18-month-old female	1.25	----
18-month-old total	0.63	1.09
TAKE TOY:		
12-month-old male	6.25	13.13
12-month-old female	6.25	7.50
12-month-old total	6.25	10.31
18-month-old male	1.88	14.38
18-month-female	24.38	14.69
18-month-old total	13.13	14.53

TABLE 4 (continued)

	Same-sex peer	Opposite-sex peer
HIT:		
12-month-old male	2.50	1.25
12-month-old female	0.63	0.63
12-month-old total	1.56	0.94
18-month-old male	----	1.88
18-month-female	3.75	0.63
18-month-old total	1.88	1.25
SHARE:		
12-month-old male	----	----
12-month-old female	3.13	8.13
12-month-old total	4.38	7.81
18-month-old male	7.50	7.19
18-month-old female	8.13	9.06
18-month-old total	7.81	8.13

TABLE 5

Spearman Rho Rank Order Correlations Among the Affiliative and Toy Behaviors

Affiliative Behaviors

	LM	LA	LP	PM	PA	PP	TM	TA	TP
Look Mother	----	.02	-.34**	-.02	-.07	-.29*	.02	-.09	-.08
Look Adults		----	.01	.16	.00	-.32**	.28*	-.08	-.15
Look Peer			----	.30**	-.26*	-.08	.20	-.26*	-.20
Prox.Mother				----	-.56**	-.47**	.81**	-.33**	-.45**
Prox.Adult					----	.38**	-.44**	.45**	.41**
Prox.Peer						----	-.35**	.21*	.61**
Touch Mother							----	-.27*	-.36**
Touch Adult								----	.21*
Touch Peer									----

Affiliative - Toy Behaviors

	Look M	Look A	Look P	Prox. M	Prox. A	Prox. P	Touch M	Touch A	Touch P
Offer toy	.02	-.27*	-.16	-.40**	.38**	.30**	-.30**	.14	.25*
Offer toy - ref.	.07	-.25*	-.14	-.36**	.42**	.21*	-.27*	.18	.21*
Accept toy	-.31**	.02	-.01	-.26*	.14	.27*	-.19	.39**	.18
Take toy	-.05	-.43**	-.22*	-.46**	.39**	.54**	-.34**	.09	.27*
Hit	.15	-.22*	-.22*	-.28*	.27*	.08	-.31**	.16	.37**
Share	-.11	-.18	-.20	-.55**	.39**	.45**	-.33**	.27*	.29*

TABLE 5 (continued)

	Toy Behaviors					
	Offer	Offer Ref.	Accept	Take	Hit	Share
Offer toy	----	.90**	.03	.45**	.24*	.15
Offer toy - ref.		----	-.06	.41**	.28*	.26*
Accept toy			----	.25*	-.07	.06
Take toy				----	.24*	.44**
Hit					----	.23*
Share						----

*$p < .05$

**$p < .01$

TABLE 6

Relationships between Demographic, Activity, and Affiliative Behavior Variables

	SES	Mother Education	#Sibs	Birth order	Hrs-Infant	Hrs-Child	Activity Rank	Activity Sum
Look M	-.31**	-.31**	.17	.17	-.08	.08	.10	.07
Look A	-.08	.09	.15	.15	-.10	-.02	-.05	-.22*
Look P	.06	.08	-.32**	-.27*	-.17	-.13	-.51**	-.52**
Prox M	-.26*	-.22*	.11	.12	-.08	.10	-.56**	-.76**
Prox A	.31**	.17	-.03	-.03	.13	-.10	.43**	.47**
Prox P	.26*	.20	-.10	-.15	.11	-.21*	.19	.50**
Touch M	-.30**	-.25*	.09	.11	-.09	.05	-.52**	-.63**
Touch A	.05	.01	.07	.13	-.03	.11	.32**	.32**
Touch P	.13	.22*	.05	-.03	.17	-.13	.18	.50**
Offer toy	.25*	.02	-.17	-.15	.12	-.15	.40**	.48**
Offer-ref	.29*	-.01	-.19	-.17	.03	-.27*	.33**	.37**
Accept toy	.11	.10	-.03	.03	-.06	.12	.05	.25*
Take toy	.11	.08	-.30**	-.29*	.02	-.25*	.36**	.55**
Hit	.18	.04	-.02	-.05	.13	.07	.38**	.49**
Share	.20	.18	-.14	-.16	.04	-.22*	.31**	.41**
Act. rank	.31**	.11	.01	.01	.17	.02		.83**
Act. sum	.26*	.11	-.03	-.06	.20	-.01		

*$p < .05$

**$p < .01$

Appendix

Name__________________ Date__________ Observer__________________

4 Minutes	Mom Initiates	Mom - Look	Touch	Prox	Smile	Offer Toy	Take Toy	Hit	Adult - Look	Touch	Prox	Smile	Offer Toy	Take Toy	Hit	Child - Look	Touch	Prox	Smile	Offer Toy	Take Toy	Hit	Share
__ Min																							
50																							
40																							
30																							
20																							
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Infant Laboratory

GENERAL INFORMATION QUESTIONNAIRE

(Peer Relationships Study)

A. Subject Information

1. Baby's name: _____

2. Date of birth: _____

3. Brothers/sisters: (list youngest first)

age	sex	name

4. Was the baby full-term?_____If not full-term, how many weeks early or late?_____

5. Age at which baby first walked without support: _____

6. Does the baby have any allergies?_____What kind?_____
Is medication being given?_____

7. Illnesses to date:_____
Has baby been hospitalized?_____
For how long?_____
Reasons:_____

B. Parent Information

1. Mother's name: _____

Address: _____City_____

Telephone number: _____

Date of birth: _____

Education: Highest school grade attended: _____

(If college graduate, please give highest degree obtained):

_____

Occupation: Present _____

Previous _____

2. Father's name: _____

Address: _____ City _____

Telephone number: _____

Date of birth: _____

Education: Highest school grade attended: _____

(If college graduate, please give highest degree obtained):

_____

Occupation: _____

_____

C. Play Experience

1. Has the baby ever participated in a play group? _____

For how long? _____

How many children in group? _____

Approximate age range of other children in group: _____

2. Average number of hours per week the baby spends with a baby-sitter (during day): _____

Are there any other children present? _____ How many? _____

Age range of these children: _____

3. Average number of hours per week baby spends with other infants (younger than 2 years; do not include siblings; e.g., babies of your friends): _____

Average number of hours per week baby spends with other children (older than 2 years; e.g., friends of brothers and sisters): _____

_____